

Development of Pigmented UV Coatings

"Industry and government working hand-in-hand can resolve many difficult environmental problems. The Ministry of Environment and Energy certainly enabled us to develop and demonstrate the benefits and efficacy of ultra-violet (UV) curable pigmented coatings."

Tony Harte
Operations Manager
Guardsman Products Limited
Cornwall, Ontario

THE COMPANY

Guardsman Products Limited is a leading producer of customized industrial coatings and resins in Canada and the United States. The Cornwall-based company, which has been in business since 1959, manufactures paint, enamels, lacquers, varnishes and wood finishes for the home appliance, residential furniture, kitchen cabinet and office furniture industries.

THE CHALLENGE

The factories in the wood products industry are geared to using conventional coatings. These coatings are inexpensive but they contain volatile organic compounds (VOCs) which when released to the atmosphere are environmentally hazardous. Prompted by environmental regulations and high energy costs, Canadian and American companies have developed coatings that not only meet government guidelines for VOC emissions but also meet the wood industry manufac-

turers' requirements for line speed and product quality.

Conventional pigmented coatings need one to 24 hours to dry in conventional gas-fired ovens. In contrast, ultra-violet (UV) pigmented coatings dry in three seconds or, in some cases, less. But UV pigmented coatings have not been used extensively because the pigments absorbed the light given off by the UV bulbs. That stopped the coatings from drying right through.

THE SOLUTION

Guardsman Products developed and tested a UV curable pigmented coating for wood finishing. The coating may be applied as a spray or by using the curtain coating method. Les Industries AP of Laurier Station, Quebec, tested the spray application method. The production line consisted of a robot spray chamber with airless spray guns that applied the coating on the tops and on the sides of medium-density fibre board panels. The panels then passed through a range of UV curing lamps which had different wavelengths and were placed on all four walls of the chamber. The line speed of the coating process equalled the company's production line speed of eight meters per minute.

With a line speed of eight metres per minute and a conveyor system which was 1.25 metres wide, the company saved six terajoules per year in energy.

OPPORTUNITIES

Pigmented UV coatings offer manufacturers the opportunity to improve their manufacturing base by providing colored coatings that dry in less than three seconds and offer a better looking and higher quality product.

Further, compared to conventional coatings and thermal gas-fired oven and blower assemblies, the UV coating process saves energy. In Ontario, there are about 350 furniture manufacturers, with an average of three furniture lines each, that use conventional coating technology. If these companies converted to pigmented UV coatings, the wood processing industry in Ontario would save about 6.3 petajoules of energy annually. UV curable coatings are offered in the United States as a technology which meets environmental guidelines for VOCs. When most UV coatings are applied, they are either free or almost free of solvents which contain VOCs. In addition:

- * UV coatings are easily combined with water and solvent-based stains and coatings which reduce the level of VOC's in both;
- * UV coatings may be applied using a spray and still have low levels of VOCs;
- * one coat of UV pigmented coating may provide the same or better build or finish than two or three coats of a conventional nitro-cellulose coating;

* UV coatings can be formulated for all the ways coatings are applied;

* the UV technology also works with stains thus reducing the number of coating and processing steps for stain-finished wood products.

PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION

Industrial companies located in Ontario may participate in ministry/industry programs that will help them to:

- * reduce, reuse and recycle solid waste;
- * reduce or eliminate liquid effluent and gaseous emissions;
- * use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

FOR FURTHER INFORMATION, PLEASE CONTACT

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